

CLAIMS

1. A contact lens user support system comprising:

5 a multiplicity of user client apparatuses for use by a multiplicity of users who use contact lenses, each apparatus including image signal acquiring means for acquiring an image signal of a contact lens used by each user;

10 a server apparatus for use by a supporting entity, the apparatus including evaluation data calculating means for deriving lens condition evaluation data for evaluating the condition of the contact lens on the basis of the contact lens image signal;

15 memory means for storing information able to be read out by the server apparatus; and

20 communication network means enabling sending and receiving of signals between the user client apparatuses and the server apparatus,

25 wherein the image signal acquired by the image signal acquiring means of the user client apparatus with the contact lens used by the user as a subject is transmitted via the communication network means to the server apparatus;

the lens condition evaluation data for the contact lens is derived by the evaluation data calculating means of the server apparatus, the lens condition evaluation data being associated with identifying information of the user and stored in the memory means; and

25 the lens condition evaluation data is transmitted via the communication network means to the user client apparatus so as to be provided to the user.

2. A contact lens user support system according to claim 1, wherein the image signal includes a motion video image signal.

3. A contact lens user support system according to claim 1 or 2, wherein the lens condition evaluation data derived by the evaluation data calculating means of the server apparatus includes at least one set of data relating to the contact lens used by the user and selected from evaluation data relating to contaminants such as protein deposits or lipid deposits; evaluation data relating to morphology such as deformation or chipping; and evaluation data relating to damage such as scratches or cracks.

4. A contact lens user support system according to any one of claims 1-3, wherein the image signal acquiring means of the user client apparatus includes: irradiating means for irradiating the contact lens used by the user with excitation light able to excite a predetermined target substance to produce fluorescence; and detecting means for detecting a lens fluorescent image formed by fluorescence produced principally by the predetermined target substance in the contact lens when illuminated with excitation light by the irradiating means.

5. A contact lens user support system according to claim 4, wherein the detecting means in the user client apparatus is composed of imaging means able to image the contact lens illuminated with excitation light by the irradiating means, and to detect it as an image signal in which levels of fluorescent intensity corresponding to the condition of the target substance are associated with locations on the contact lens.

25 6. A contact lens user support system according to claim 5, wherein the evaluation data calculating means in the server apparatus is constituted to include cumulating means for cumulating fluorescent intensity in pixel units derived on the basis of the image signal of the contact lens acquired by the imaging means of the user client apparatus.

7. A contact lens user support system according to claim 6, wherein the predetermined substance excited by means of the excitation light is a contaminant deposit such as a protein or lipid deposited on the contact lens, and the server apparatus is constituted to include: (i) calibration curve creating means for creating a calibration curve indicating a relationship between a product of fluorescent intensity of a standard solution of known concentration having dissolved therein a component of interest in the contaminant deposit on the contact lens and the detected area thereof, to a dissolved amount of component of interest of the contaminant deposit in the standard solution; and (ii) quantifying means for comparing a cumulative value derived by the cumulating means with a calibration curve derived by the calibration curve creating means to carry out quantification of the contaminant deposit on the contact lens.

15 8. A contact lens user support system according to any one of claims 5-7, wherein the evaluation data calculating means in the server apparatus, on the basis of the image signal of the contact lens acquired by the imaging means of the user client apparatus, analyzes the fluorescence of the contact lens into multi-tone color to derive the lens condition evaluation data, and the user client apparatus is provided with monitor means for displaying the fluorescence of the contact lens in multi-tone color, on the basis of the lens condition evaluation data transmitted thereto through the communication network means.

25 9. A contact lens user support systems according to any one of claims 1-8, further comprising reference signal memory means adapted to store therein data of a multiplicity of reference image signals acquired in advance for unused contact lenses respectively having same specifications as various types of the contact lenses used by the multiplicity of the users, wherein the evaluation data calculating means of the server apparatus

processes by calculation the image signal of the contact lens used by the user while referencing to the reference image signal provided by the reference signal memory means in order to obtain the lens condition evaluation data for the lens.

5

10. A contact lens user support system according to claim 9, wherein for the various types of the contact lenses used by the multiplicity of the users, reference is made to reference image signals for corresponding unused contact lenses having identical specifications therewith, which reference includes a lot number.

10

11. A contact lens user support system according to any one of claims 1-10, further comprising membership cost management means adapted to store therein membership cost payment information made by the users to the supporting entity, wherein the server apparatus verifies membership cost payment status of the user on the basis of the membership cost payment information stored in the membership cost management means, and the lens condition evaluation data is transmitted to the user client apparatus on the condition of the user having paid the membership cost to the supporting entity.

20

12. A contact lens user support system according to any one of claims 1-11, further comprising in the server apparatus image signal requesting means that, once the server apparatus has received the image signal from the user client apparatus via the communication network means, counts for a predetermined set time period, and when the set time period has elapsed request the user client apparatus via the communication network means to transmit a new image signal.

25

30

13. A contact lens user support system according to any one of claims

1-12, further comprising a lens provider client apparatus for use by a lens providing entity that manufactures the contact lenses, wherein sending and receiving of signals between the lens provider client apparatus and the server apparatus is possible by means of the communication network means, and wherein the lens condition evaluation data is transmitted from the server apparatus to the lens provider client apparatus, and basic data provided for contact lenses manufactured by the lens providing entity is transmitted from the lens provider client apparatus to the server apparatus.

10 14. A contact lens user support system according to claim 13, wherein the lens provider client apparatus comprises reference image signal acquiring means for acquiring the reference image signals in claim 8, the reference image signals being transmitted to the server apparatus by way of at least one item of the basic data.

15

15. A contact lens user support system according to any one of claims 1-14, further comprising: a lens dealer shop client apparatus for use by a lens dealer shop that sells the contact lenses directly to the users, wherein sending and receiving of signals between the lens dealer shop client apparatus and the server apparatus is possible by means of the communication network means, and the lens condition evaluation data is transmittable from the server apparatus to the lens dealer shop client apparatus; and comprising visit instructing means that refers to the lens condition evaluation data, and if necessary transmits from the server apparatus to the user client apparatus a dealer shop visit instruction signal that instructs the user to visit the lens dealer shop.

16. A contact lens user support system according to claim 15, wherein examination information relating to results of examination of the user who has visited the lens dealer shop is transmitted from the lens dealer shop

client apparatus to the server apparatus, the information being associated with identifying information for the user and stored in the memory means.

17. A contact lens user support system according to any one of claims 1-16, further comprising lens characteristic memory means for storing characteristic data for each type of the contact lens used by the users and/or care product characteristic memory means for storing characteristic data for care products of various types used with contact lenses used by the users, wherein in the server apparatus, information relating to protein deposits, lipid contaminants, or other contamination of the contact lens used by the user is acquired on the basis of the image signal acquired from the user client apparatus, and in the evaluation data calculating means, characteristic data stored in the lens characteristic memory means and/or care product characteristic memory means is utilized to derive from the information relating to recommended measures to be taken in regard to contamination of the contact lens, the information relating to recommended measures being included in the lens condition evaluation data, and the lens condition evaluation data being transmitted to the user client apparatus.
18. A contact lens user support system according to claim 17, further comprising lachrymal fluid data memory means for storing lachrymal fluid data relating to the properties of the lachrymal fluid of the user, wherein in the evaluation data calculating means, recommended measures in relation to the contact lens are derived from information relating to the contamination utilizing characteristic data stored in the lens characteristic memory means and/or the care product characteristic memory means, while making reference to individual the lachrymal fluid data for the user stored in the lachrymal fluid data memory means.
19. A contact lens user support system according to any one of claims

1-18, wherein in the server apparatus information relating to protein deposits, lipid contaminants, or other contamination of the contact lens used by the user is acquired on the basis of the image signal acquired from the user client apparatus, lens characteristic memory means are provided
5 for storing characteristic data regarding various kinds of the contact lenses used by the users, wherein the evaluation data calculating means, contact lens characteristic data stored in the lens characteristic memory means is utilized in deriving evaluation data of compatibility of the contact lens of the user from the information relating to contamination, with the resultant
10 lens compatibility evaluation data being included in the lens condition evaluation data as information relating to the recommended measures, and the lens condition evaluation data transmitted to the user client apparatus.

20. A contact lens user support system according to any one of claims
15 1-19, wherein in the server apparatus information relating to protein deposits, lipid contaminants, or other contamination of the contact lens used by the user is acquired on the basis of the image signal acquired from the user client apparatus, while care product characteristic memory means are provided for storing characteristic data regarding various kinds of lens
20 care products for use with the contact lenses used by the users, and wherein in the evaluation data calculating means, lens care product characteristic data stored in the care product characteristic memory means is utilized in deriving evaluation data of compatibility of the lens care product of the user from the information relating to contamination, with the resultant
25 compatibility care product evaluation data being included in the lens condition evaluation data as information relating to the recommended measures, and the lens condition evaluation data transmitted to the user client apparatus.

30 21. A contact lens user support system according to claims 19 or 20,

wherein at a point in time coming at the end of a predetermined trial period commencing with initial use of new contact lenses by the user, and/or in the event that use of contact lenses by the user is ongoing a point in time coming after a predetermined time interval has elapsed, evaluation data of compatibility of the contact lenses or the lens care product is derived.

22. A contact lens user support method characterized in that an image signal of a contact lens acquired by a user of the contact lens himself is transmitted through communication network means from a user client apparatus provided for use by the user to a server apparatus provided for use by a supporting entity; at the supporting entity, lens condition evaluation data for evaluating a condition of the contact lens is derived on the basis of the contact lens image signal; the lens condition evaluation data is associated with individual information for the user and stored in memory means utilizable by the server apparatus; and the lens condition evaluation data is provided to the user by being transmitted to the user client apparatus through the communication network means.

23. A contact lens user support method according to claim 22, wherein the contact lens image signal includes a motion video image signal.

24. A contact lens user support method according to claims 22 or 23, wherein the lens condition evaluation data provided to the user by being transmitted from the server apparatus to the user client apparatus includes evaluation data relating to protein deposits, lipid deposits, or other such contaminants, and/or evaluation data relating to morphology such as deformation or chipping, and/or evaluation data relating to damage such as scratches or cracks in the contact lenses used by the user; and wherein information relating to the need to replace the contact lenses and information relating to a lens dealer shop serving as provider for the

contact lens replacement, user examination and the like are provided to the use together with the lens condition evaluation data, by being sent to the user client apparatus.

5 25. A contact lens user support method according to any one of claims 22-24, wherein when the contact lens image signal is transmitted from the user client apparatus to the server apparatus, reference information relating to lens wear conditions by the user and the like is included in the transmission.

10

26. A contact lens user support method according to any one of claims 22-25, wherein multiple items of advice information relating to contact lens handling and wear are prepared in advance, and one of the items is selected with reference to the lens condition evaluation data provided to 15 the user and provided to the user together with the lens condition evaluation data.

27. A contact lens user support method according to any one of claims 22-26, wherein examination information relating to examination results for 20 a user acquired at a lens dealer shop directly selling the contact lenses to the user is transmitted from a lens dealer shop client apparatus used by the lens dealer shop to the server apparatus, and is associated with individual information for the user and stored in the memory means utilizable by the server apparatus.

25

28. A contact lens user support method according to any one of claims 22-27, wherein information stored in association with individual information for the user in the memory means is utilizable from outside the server apparatus through the communication network means, on the 30 condition of verification of a match with pre-registered identifying

information or the like.

29. A contact lens user support method according to any one of claims 22-28, wherein in the supporting entity, information relating to protein 5 deposits, lipid contaminants, or other contamination of the contact lens used by the user is acquired on the basis of an image signal of the contact lens; utilizing lens characteristic data for various types of contact lenses and/or care product characteristic data relating to lens care products of various types for use with the contact lenses, recommended measures to be 10 taken with regard to the contact lens are derived from information relating to contamination of the contact lens; and information relating to the recommended measures is included in the lens condition evaluation data and provided to the user.

15 30. A contact lens user support method according to claim 29, wherein information relating to the properties of the lachrymal fluid of a user is acquired, and while making reference to the lachrymal fluid data, the lens characteristic data and/or the care product characteristic data is utilized to derive from the information relating to contamination recommended 20 measures to be taken with regard to the contact lens.

31. A contact lens user support method according to claims 29 or 30, wherein wherein at a point in time coming at the end of a predetermined trial period commencing with initial use of new contact lenses by the user, 25 and/or in the event that use of contact lenses by the user is ongoing a point in time coming after a predetermined time interval has elapsed, the recommended measures to be taken with regard to the contact lens are derived.